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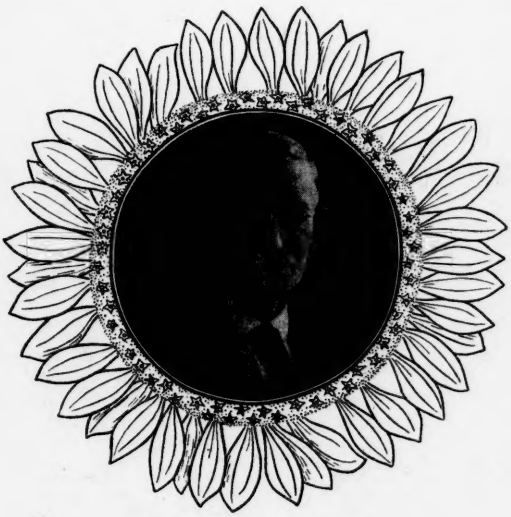

WARREN KNAUS
1858-1937.

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WARREN KNAUS

Warren Knaus was born in Jay County, near Liber, Indiana, February 24, 1858. He died June 28, 1937, at McPherson, Kansas.

At the age of twelve Doctor Knaus moved West with his parents to a farm near Roper, Wilson County, Kansas, which farm he owned at the time of his death. After graduating from high school in 1876, he taught school for three years and in the fall of 1879 entered the Kansas State Agricultural College. He graduated in 1882, receiving the degree of Bachelor of Science. During the next four years he taught school in Dickinson County and also held a position on the Salina Herald. In 1885 he obtained the Master of Science degree from the Kansas State Agricultural College. On October 1, 1886, there was issued in McPherson County the first democratic paper called "The Democrat", which was edited and published by Doctor Knaus. In 1912 another democratic paper—"The Opinion"—which had been published for several years at McPherson, was purchased by Doctor Knaus and consolidated with the Democrat to form the Democrat-Opinion, which was owned and published by Doctor Knaus up to the time of his death. It was during 1880-1881, when Doctor Knaus was in the class of Entomology taught by Prof. Edwin A. Popenoe, who was an inspiring teacher and scientist, that he became intensely interested in insects and began his hobby. Through the collection of beetles and exchange with other collectors, he not only developed a hobby which asserted itself through his entire life, but also made him an outstanding systematic entomologist and an all-round naturalist.

For nearly fifty years Doctor Knaus spent the greater part of his spare time in making field trips to collect beetles in Kansas, Oklahoma, Colorado, Nebraska, Arizona, Texas, Nevada, New Mexico, California, Utah and Mexico. During all of this time he contributed valuable additions both to the Kansas lists of Coleoptera and

to the lists of the Southwest. Approximately 40 distinct species of beetles have been named or christened "knausi". On one of his collecting trips to New Mexico he found a beetle which belonged to a new genus and bears the name of "Knausea". During these same years Doctor Knaus corresponded with the most prominent Coleopterists throughout the world, and was recognized by them as an authority on beetles. Many of these men visited him at McPherson, Kansas. For instance, Dr. Walther Horn, whom Doctor Knaus regarded as the greatest living Coleopterist, visited and collected with him in 1902.

The excellent private collection of North American Coleoptera, consisting of nearly 10,000 distinct species and nearly 90,000 specimens, was given by Doctor Knaus to the Kansas State College, his alma mater, in March, 1917. This valuable collection was transferred to the college on July 8, 1937, shortly after his death. His large scientific entomological library also was given to the college at that time. The collection is stored in a fire-proof vault and the scientific library is in the college library.

In 1927 Doctor Knaus was awarded the honorary degree of Doctor of Science from the Kansas State College. McPherson College, McPherson, Kansas, also awarded the honorary degree of Doctor of Science to Doctor Knaus. He was made a member of the honorary society of Phi Kappa Phi of the Kansas State College Chapter. In the spring of 1881, on the advice of Professor Popenoe, he joined the Kansas Academy of Science. He was a faithful member of the Academy for fifty-six years, its president in 1929, and at the time of his death was the oldest living member from the point of view of service. Doctor Knaus was also one of the founders of the Kansas Entomological Society in 1927, and in 1937 was its president. He was the publisher of theJournal of the Kansas Entomological Society.

During the forty-five years that the writer had the pleasure of knowing Doctor Knaus, he found him to be a generous, trustworthy, dependable and loyal friend. His whole life was one of service and he was most happy when serving others. To all who knew him the loss of his fellowship and rich experience is incalculable. In his death, systematic entomology has suffered a real loss and his associates, coworkers and friends in the United

States, Canada, and many other foreign countries, will feel intimately the loss of his fine generosity and stimulating influence.

Geo. A. Dean.

ORTHOPTERA OF AN EASTERN NEBRASKA PRAIRIE

DON B. WHELAN, University of Nebraska.

The following list of Orthoptera is part of an ecological study of the animals of a prairie located about nine miles northwest of Lincoln. It is the same prairie from which two previous studies were made, one on the beetles[1] and one on the mammals[2].

Many of the species were identified by J. A. G. Rehn (R), several by Harold A. Hauke (H) and many by the author (W). The following species were collected:

Mantidae

Oligonicella scudderi bolliana (S-Z) (R). A single specimen was swept from grass on the high prairie, on August 16.

Phasmidae

Diapheromera veliei Walsh (W). Out of several hundred specimens this was the only species present. immature forms were abundant during May and the adults frequently from May 24 to September 3 on both high and low prairie.

Manomera blatchleyi (Caud.) (R). One male was captured on low prairie grass on September 6.

Acrididae

Pseudopomala brachyptera (Sc.) (R). All were captured on low prairie; females July 5 to September 10, and males August 2 to 30. Found on grass and **Solidago rigida.**

Mermiria maculipennis mcclungi Rehn (R). Two specimens were taken on low prairie grass, August 20 and 29.

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1 Whelan, Don B. Coleoptera of an Original Prairie Area in Eastern Nebraska. Jour. Kans. Ent. Soc., ix, pp. 111-115, 1936.

2. ————————. Some Mammals of a Nebraska Prairie. Trans. Kan. Acad. Sci., XXXIX. pp. 365-366, 1936.

Syrbula admirabilis Uhler (W). Found on high prairie grass on September 3.

Eritettix tricarinatus (Thos.) (R). Nymphs were caught from September 6 to April 12, adults from April 23 to July 24 on both high and low prairies. Adults common in May and June.

Eritettix simplex (Sc.) (W). Specimens were taken on May 17 and June 8.

Orphullela speciosa (Sc.) (R.) July 5 to October 10, more common on high prairie in spring and fall.

Dicromorpha viridis (Sc.) (W). One specimen was taken in a low prairie ravine on September 27.

Agenotettix deorum (Sc.) (R). July 10 to October 11, mostly high prairie grass. Numerous in September.

Arphia pseudonietana (Thos.) (R). On August 28 a specimen was taken on the low prairie.

Arphia xanthoptera (Burm.) (R). Nymphs during winter until May, adults March 21 to October 25, mostly on high prairie in summer and low prairie in late fall. Both red and brown forms present.

Arphia simplex Sc. (R). One specimen taken on July 12.

Encoptolophus sordidus (Burm.) (R). August 28 to October 10, mostly in ravines and common in September.

Pardalophora apiculata (Harr.) (R). Adults April 23 to October 25, and nymphs August 30 until spring, mostly on high prairie.

Pardalophora haldemanii (Sc.) (H). June 1 to September 23. It over-winters as a nymph.

Dissosteira carolina (L.) (R). Two specimens taken, on August 15 and 20, on low prairie not far from a road.

Brachystola magna (Gir.) (R). Nymphs taken July 12 and August 20, adults August 2 to September 7, all on low prairie.

Schistocerca americana Harr. (H). One specimen, July 30 on high prairie.

Schistocerca alutacea Harr. (H). Adults August 2 to October 12, mostly on low prairie and on **Solidago rigida.** Three nymphs August 2, 10 and 16.

Schistocerca lineata Sc. (H). Taken on August 20 and October 20.

Hypochlora alba (Dodge) (R). Adults on high prairie August 16 and low prairie August 2 to September 10, later on **Solidago rigida.** Nymphs August 28.

Campylacantha olivacea olivacea (Sc.) (R). Taken September 8 and again October 10.

Hesperotettix brevipennis pratensis (Sc.) (R). July 5 to October 10, mostly on low prairie. Common during July and August.

Hesperotettix speciosa (Sc.) (W). Two specimens caught on August 29.

Melanoplus scudderi latus Morse (R). From September 14 to October 25, a mating pair captured on the former date.

Melanoplus differentialis (Thos.) (W). Nymphs until August 20, adults August 2 to September 27. More numerous on low prairie.

Melanoplus bivittatus (Say) (W). Nymphs May 17 to August 30, adults July 5 to September 3. Common on low prairie.

Melanoplus dawsoni (Sc.) (R). A few brachypterous forms taken between August 3 and October 25.

Melanoplus confusus Sc. (R). May 27 to September 20, mostly on low prairie. Common in June and July.

Melanoplus femur-rubrum femur-rubrum (DeG.) (R.) Adults July 26 to October 10, most common in July and August on both high and low prairie.

Melanoplus mexicanus mexicanus Saus. (R). From July 5 to October 25, very common during August and September. Mostly on high prairie.

Melanoplus keeleri luridus (Dodge) (R). Adults July 30 to October 25, common in August and September. Nymphs mostly taken from spring until August.

Phoetaliotes nebrascensis (Thos.) (R). Nymphs from July 5 to August 8, adults from August 18 to October 25, mostly on grass, one on weeds and one on **Solidago rigida.**

Tettigoniidae

Phaneroptera texensis (S & P) (R). Nymphs were taken from June until August 9, adults July 26 to October 10 in grass and on **Solidago rigida.** Quite common during August and September.

Phaneroptera furcata furcata (Brun.) (R). Nymphs until August 18 and adults from August 20 until October

9, on low prairie.

Amblycorypha parvipennis brachyptera Ball (R). A female was taken on August 8 and a male on July 10.

Microcentrum rhombifolium (Sauss.) (R). Collected on September 5 and October 7.

Neoconocephalus ensiger (Harr.) (R). Nymphs July 12 to August 2. Adult males July 18 to September 30 and females August 16 to September 20.

Orchelimum vulgare Harr. (R). Very common on low prairie and in the ravines, especially on **Solidago rigida** and **Solidago glaberrima.** Adults from July 26 to September 18.

Conocephalus fasciatus fasciatus (DeG.) (H). One specimen was taken on August 20.

Conocephalus brevipennis (Sc.) (R). A male was taken on August 28 and a female on September 6.

Conocephalus nemoralis (Sc.) (R). One nymph and two adult specimens, both females, taken in a prairie ravine on August 30.

Conocephalus strictus (Sc.) (R). Adults August 8 until October 25 on both high and low prairies, nymphs on high prairie August 16 until early October.

Conocephalus nigropleurum (Brun.) (R). Two specimens were taken in a ravine, one on August 23 and the other August 30.

Conocephalus saltans (Sc.) (R). Macropterous forms August 2 to August 28. Brachypterous forms August 16 to October 10. Both found on high and low prairies.

Phrixocnemis sp. (W). Two nymphs caught on April 23, under stones on low prairie.

Gryllidae

Gryllus assimilis (Fab.) (H). Caught on three dates, July 8, 10 and 16.

Nemobius fasciatus fasciatus (DeG.) (R). One nymph August 18 and one adult on September 20, in low prairie.

Oecanthus nigricornis quadripunctatus Beut. (R). Swept from grass, weeds and from **Solidago glaberrima,** July 12 to October 3, on low prairie, mostly in August.

Oecanthus niveus (DeG.) (R). Only taken from weeds on high prairie on August 28.

NOTES ON OVIPOSITION AND SEX RATIO IN HYPOSOTER PILOSULUS PROV. (HYM.: ICHNEUMONIDAE)

RALPH B. SWAIN*,
WILLIAM GREEN, ROLAND PORTMAN

In mid-September, 1935, an experiment was undertaken at Ft. Collins, Colorado to determine the sex ratio in **Hyposoter pilosulus** Prov., a primary, ichneumonid parasite of the fall webworm, **Hyphantria cunea** Drury. Parasite material was on hand in abundance from rearings made during the summer by the senior author. The fact that he had reared only male wasps from the eggs of unmated females prompted the further investigation.

Normally there are two generations of **Hyposoter** upon the fall webworm at Fort Collins. The wasps from which the first stingings were obtained in this experiment were late-issuing individuals of the regular second generation, or individuals reared in the insectary from early-issuing second generation wasps.

The female wasps were kept in 2 and ½ by 10 centimeter glass vials with cotton stoppers. They were given sugar water for food. Into these vials males were introduced for mating and webworm larvae for oviposition.

Behaviour During Oviposition

Hyposoter females are attracted to webworm larvae in all stadia from the second to the last. (**H. cunea** larvae pass through eight stadia at Ft. Collins, Colo.) The wasp is usually immediately aware of the presence of a webworm larva in its vial. It vibrates its antennae more and more rapidly, then runs toward the victim. The larva may sense the approach of the wasp. At any rate, by the time the wasp has brushed the larva with its antennae, the latter is vigorously trying to escape, thus presenting the posterior part of the body to its pursuer. This is probably why most eggs are laid in the hinder parts of the larvae. Not infrequently, however, wasps oviposited just back of the head of the larva. During the act of oviposition the wasp bends the abdomen underneath the thorax and stabs forward with the ovipositor. If the thrust is successful and the skin of the webworm is pierced, the wasp usually loses its hold on the wall of

* Formerly of the Dept. of Ent. and Zool., Colorado State College, Ft. Collins, Colo.

the vial and is dragged along for a second by the retreating larva. It then finds a foothold and releases the ovipositor. In the field, the wasp has been seen beating its way through the webbing of the **Hyphantria** nests in pursuit of larvae. A wasp may stab its victim repeatedly, often three to five times, apparently ovipositing, before the larva can be removed from the vial.

Progeny of Virgin Females

The sixty- eight wasps reared from the eggs of twelve unmated females in this experiment as well as forty-nine reared from three unmated females earlier in the season by the senior author were all male.

Mating

Eight matings occurred under observation. The male seizes the female by the abdomen with the first pair of legs and bends the tip of its own abdomen down and forward to meet that of the female. The time required for copulation varied from three and one half to six minutes, an average of about five minutes.

Progeny of Mated Females

Ninety-two adults were reared from the eggs of seven mated females, the distribution of the sexes being as follows:—

Mother	Progeny	
Cage No.	**Male**	**Female**
I.	9	8
II.	1	10
III.	1	11
IV.	2	4
V.	1	1
VI.	14	4
VII.	16	10
Total	44	48

The ratio of males to females in the progeny of mated females is approximately one to one.

General Observations

According to Tothill* the parasite has three larval stadia. Dissections of parasitized webworms were not made in this study, but the following information was gathered concerning the length of the larval and pupal periods from records on one hundred and fifty-nine wasps reared in a greenhouse with a minimum temperature of 60 degrees Centigrade:—the average length of time required for growth from egg to adult was forty-three days; the average time from oviposition to formation of cocoon was thirty-two days; the average time from formation of cocoon to issuance, approximately the pupal period, was eleven days.

The longest-living wasp issued October 15 and died November 2, a space of eighteen days. It oviposited in thirty webworm larvae. Another female, living fourteen days, oviposited in ninety-six larvae. This wasp deposited the following number of eggs on each of nine successive days: 4, 8, 25, 17, 12, 1, 17, 9, 3.

In general, wasps would oviposit in webworm larvae within a very short time after issuance and would be just as active at night under artificial light as in the daylight. Quite often a wasp would oviposit in larvae given it at the rate of one or more a minute for as many as twenty minutes without seeming to tire. One wasp stung forty-seven larvae within two hours and five minutes.

Last stadium webworms stung by wasps invariably pupated. The parasite larva could usually be found within the pupa, often in the third stadium, apparently dead of phagocytosis. No wasp was ever reared from a webworm pupa.

Conclusions

Hyposoter pilosulus Prov., an ichneumonid parasite of the fall webworm, is easily reared under laboratory conditions. Webworms in all stadia from the second to last are attractive to the parasite, but parasites probably never issue from larvae parasitized in the last stadium. Eggs from virgin wasps produce only males. Eggs from mated females produce both males and females in the ratio of approximately one to one. A female wasp may live considerably more than two weeks in the laboratory and may lay as many as forty-seven eggs in a day.

* Tothill, J. D. Dom. Can. Dept. Agr. Bull. n. s. 3, 1922, The natural control of the fall webworm in Canada, etc.

NOTES ON AN INTERESTING FOOD HABIT OF FALSE WIREWORM ADULTS

H. H. WALKDEN, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, and H. R. BRYSON, Kansas Agricultural Experiment Station*.

The literature pertaining to the false wireworms contains several brief notes on the food habits of the adults, but the writers were unable to find mention of the interesting food habit described in this paper. Therefore, it appears worthwhile to place these observations on record, together with a brief summary of the references on the subject known to the writers.

Hyslop (4) observed the adults feeding on the seed of corn and wheat; on leaves of corn, of **Polygonum littorale,** and of other weeds; and on decaying vegetable matter. Webster (9) states that **Eleodes sulcipennis** Mann. was reported by farmers to feed upon the larvae of the alfalfa weevil in Utah, and that **Eleodes suturalis** Say was reported by E. O. G. Kelly to devour chinch bugs near Wellington, Kans., but apparently preferred the partially decayed leaves of corn under which the chinch bugs were hiding. Baerg (1) reports that the adult beetles of **Eleodes tricostata** Say feed on the foliage of many of the common weeds and grasses. McColloch (6) states that the adults of **Eleodes opaca** Say feed on a wide range of food plants, and were observed in the field feeding on evening primrose, Russian thistle, alfalfa, and damp wheat in the stack or shock. One beetle was found feeding on a nymph of **Melanoplus differentialis** Thomas. McColloch also states (5) **that Eleodes quadricollis** Esch. was recorded by Riley as injuring grape foliage in California, and that **Eleodes omissa borealis** Blaisd. was noted by Essig feeding on leaves of apricot, orange, plum, and watermelon, and that the adults of **Eleodes tricostata** Say have been found feeding in the field on Solidago, **Euphorbia marginata,** prairie clover, and evening primrose. Wakeland (8) observes that the adults of **Eleodes hispilabris** Say have a wide range of foods, and that a complete list would include nearly everything of an organic nature found in their habitat. Yothers (10) records the adults of **Sphaeriontis muricata** Leconte as injurious to the buds, blossoms, and young leaves of fruit trees in Washington. Beamer (2) reports the collection

* Contribution No. 447 from the Department of Entomology.

in the Medora Sand Hills of several adult **Eleodes hispilabris nupta** Lec. at mouse traps baited with dry oatmeal.

On September 21, 1936, the senior author observed large numbers of false wireworm adults congregated on the mounds of the mound-building prairie ant, **Pogonomyrmex occidentalis** Cresson, in a wheat-stubble field near Meade, Kans. There were many beetle-infested mounds in this field. Several hundred beetles were observed on some of the large anthills, the concentration being greater on the larger mounds.

On closer examination it was found that the beetles were devouring seeds which the ants had dropped here and there in the sand composing the mound. No observations were made regarding the kinds of seeds being gathered by the ants, or the particular types of seeds taken by the beetles. Headlee and Dean (**3**) report that many different kinds of seeds are gathered and stored in the galleries, the kind of seeds being governed by the species of plants surrounding the mound. Occasional beetles were noted burrowing into the gallery entrances of the ant hills, but it was not determined whether they were able to penetrate deeply enough to reach the stored seed.

In a number of instances an ant returning to the nest with a seed was observed to be set upon by several beetles and robbed of its food. Eight or ten of the beetles would beset the ant, piling up in a struggling mass, those on the outside attempting to penetrate to the seed while those on the bottom were forced outward. The contest continued until some fortunate individual made off with the seed, whereupon the contestants would disperse and resume their search for food. Viewed from a distance of a few feet the moving mass of beetles presented the appearance of a slowly revolving ball. With the onset of the beetles, the ant promptly dropped the seed and attempted defense by biting at the legs of her attackers. However, the colony in general was apparently undisturbed by the presence of so many intruders.

The above observations were made about 5 P. M. on a warm sunny day. On the following day (September 22) the field was visited again at about the same hour. Very few false wireworm adults could be found, owing no doubt to the lower temperature and clouds obscuring the sun.

On October 8, 1936, near Stockton, Kans., the authors observed the same phenomenon of false wireworm adults congregated on ant hills and stealing seeds from the ants. Similar observations were made at intervals along the road between Stockton and Ellis, Kans., on the same date.

Parks (7) states that the adults of **Eleodes tricostata** Say have a very peculiar habit of sunning themselves on anthills during the warm days of winter, and that there must be some vital connection between this beetle and the agricultural ant, as adult **Eleodes** are more abundant near the anthills than elsewhere. He does not mention the peculiar predatory habit herein described.

Evidently this habit of robbing ants of their food is possessed by several species of the false wireworms, since collections made on anthills at Meade and Stockton, Kans., and roadside collections between Stockton and Ellis, showed the following species to be present: **Eleodes obsoleta** Say, **E. opaca** Say, **E. suturalis** Say, **E. tricostata** Say, and **Eusattus difficilis** Leconte. The identifications were made by the junior author. **Eleodes obsoleta** was the predominant species at Meade on September 21, while **E. opaca** was taken in greatest abundance on October 8, in the vicinity of Stockton.

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THREE MACROSIPHINA APHIDS[1]

GEORGE F. KNOWLTON, Logan, Utah

The following report deals with three apparently undescribed aphid species belonging to the subtribe Macrosiphina. One constitutes a third member of the **Macrosiphum albifrons** group, the other two being placed in genus **Amphorophora.**

Amphorophora Goldamaryae n. sp.

Apterous vivipara.—Size 2.35 to 2.5 mm. long; 0.91 to 1.25 across abdomen; 0.49 wide through eyes; antennae pale to near apex of IV, mostly dusky beyond, 3.41 to 3.64 mm. long; antennal III, 0.84 to 0.884 mm. long with 3 to 4 sensoria; IV, 0.61 to 0.632; V, 0.6 to 0.65; VI, 0.142 to 0.173+0.99 to 1.1; rostrum reaching third coxae; rostral IV plus V, 0.13 long, apex slenderly obtuse; hind tibiae 2.1; hind tarsi 0.11; cornicles pale, imbricated, with 4 to 5 rows of reticulations at apex; cauda pale, 0.34 total length, 0.26 mm. long on mid-line.

Alate vivipara.—Size 2.45 mm. long; width through eyes, 0.5; antennae 4.3 long, dusky beyond first sensorium, becoming darker beyond; antennal III, 0.96 mm. with 18 to 20 sensoria; IV, 0.77; V, 0.79; VI, 0.2+1.26 mm.; hind tibiae 2.5; hind tarsi 0.14; cornicles pale, 0.76; cauda pale, 0.35 mm. long with three lateral hairs.

Collections.—Taken upon goldenrod, **Solidago canadensis,** in Brigham Canyon and Logan Canyon, Utah, June 17, 1925 (G. F. Knowlton and Mary W. Knowlton).

1 Contribution from the Department of Entomology, Utah Agricultural Experiment Station.

Taxonomy.—Apterous **Amphorophora goldamaryae** run to **Amphorophora pallida** Mason in Mason's key (Proc. U. S. Nat. Mus., 67:6, 1925) from which they differ in antennal tubercles not unusually long, less dilation of longer cornicles, cauda not constricted at base, and longer antennal segments, especially III. It more nearly resembles **A. spiraecola** Patch, from which it differs in having cornicles shorter than antennal III, antennals IV and V distinctly shorter than III, and shorter base of VI*.

Types—In the collection of the writer and in the U. S. National Museum.

Amphorophora janesi n. sp.

Alate vivipara.—Abdomen apple green; size 1.9 mm. long, 0.8 wide across abdomen, and 0.38 across eyes; antennae 2.25 plus mm. long, black; antennal III, 0.51 with 12 sensoria; IV, 0.43; V, 0.41; VI, 0.126 plus 0.55 plus mm.; rostrum reaching second coxae; rostral IV plus V, 0.12 mm. long, obtuse at apex; wing venation normal, but with faint shading along margin of cubitus, darker bordering along anal, which fans out as it approaches anal margin of wing and dusky, broken areas on membrane near both sides of proximal half of anal; hind tibiae 1.29; hind tarsi 0.12; cornicles 0.63 mm., black, lightly imbricated, distal row or two approaching a faintly reticulated condition; cauda pale, 0.22 mm. total length, with 2 lateral hairs.

Apterous vivipara.—Color apple green; size 1.6 to 1.7 mm. long and 0.38 across eyes; antennae black beyond base of III, 2.21 to 2.27 long; antennal III, 0.49 to 0.57 mm. long, without sensoria; IV, 0.34 to 0.38; V, 0.34; VI, 0.11 plus 0.7 to 0.12 plus 0.67 mm.; rostrum reaching third coxae; rostral IV plus V, 0.11 to 0.126; hind tibiae 1.2 to 1.34; hind tarsi 0.11 to 0.13; cornicles black, 0.62 to 0.73, last row or two in stage bordering between reticulations and imbrications; cauda 0.2 midline, 0.25 mm. total length.

Collections.—In Red Canyon, above Cedar City, Utah, May 2, 1934 (G. F. Knowlton). Host?

Taxonomy.—Amphorophora janesi keys to **Amphorophora nervata** (Gillette) in Mason's key (Proc U. S. Nat. Mus., 67: 5-7), from which it differs in having

* The writer is indebted to Dr. P. W. Mason for his opinion concerning this species.

noticeably darker cornicles and antennae, and dark tibiae in both aptera and alate. It differs from **A. morrisoni** (Swain) in having darker and less swollen cornicles with much less apparent reticulations and fewer lateral hairs on cauda. Named in honour of the author's former associate, M. J. Janes.

Types.—In the collection of the writer and in the U. S. National Museum.

Macrosiphum thermopsaphis n. sp.

Apterous vivipara.—Color light green with a dorsal covering of grayish pulverulence; size 3.9 to 4.51 mm. long to base of cauda; antennae 5.03 to 5.59 mm. long, pale to dusky on proximal end, gradually becoming darker toward apex; antennal III, 1.16 to 1.31 mm. long and typically with 5 to 17 sensoria usually confined to basal half of segment; IV, 1.02 to 1.15; V, 0.86 to 1.04; VI, 0.19 to 0.24+1.65 mm.; rostrum reaching second coxae, apex slenderly obtuse; rostral IV plus V, 0.158 mm. long; hind tibiae 3.4 to 4.4; hind tarsi 0.22 to 0.24; cornicles pale, dusky at tip, 0.95 to 1.27 mm. long; cauda pale, 0.65 to 0.82 mm. long, and 0.56 to 0.68 on mid-line.

Alatea vivipara.—Color green, pruinose; size 2.95 to 3.25 mm. long; 0.66 through eyes; antennae 5.27 to 6.2 mm. long, dusky, becoming darker beyond middle of IV; antennal III, 1.2 to 1.27 mm. long with 28 to 39 sensoria; IV, 1.24 to 1.26; V, 1.11 to 1.14; VI, 0.24+1.86; hind tibiae 2.73 to 3.84; hind tarsi 0.22 to 0.24; cornicles pale, dusky to blackish at tip, 0.82 to 0.92; cauda pale, 0.58 mm. total length.

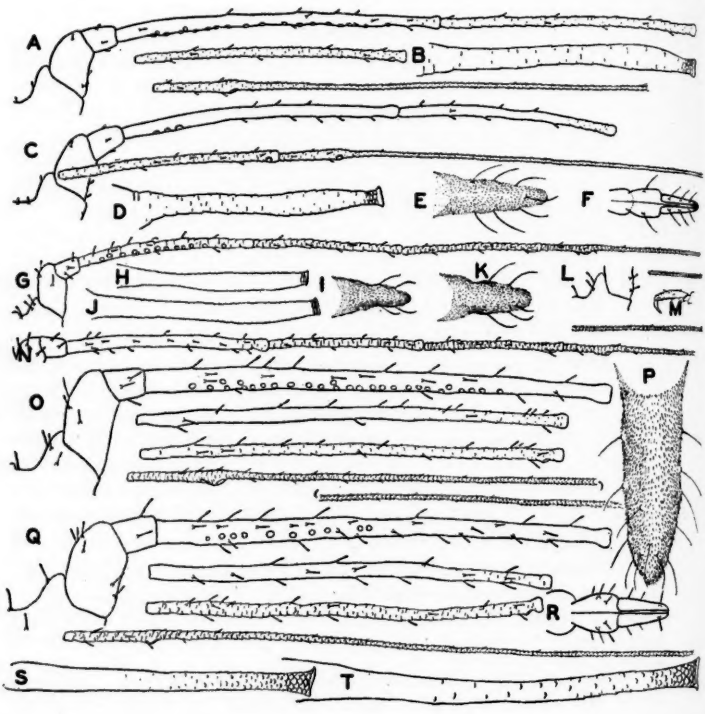
Collections.—Pingree Park, Colorado, August 19, 1935, on **Thermopsis pinctorium** (G. F. Knowlton—M. A. Palmer), and August 20-22, 1935 (Knowlton). Rather abundant.

Taxonomy.—Macrosiphum thermopsaphis differs from **M. zionesis** Knlt. in having pale cornicles, shorter hind tarsi, and more secondary sensoria; it differs from **M. albifrons** Essig in possessing fewer sensoria on antennal III of aptera, and in antennal IV being almost equal to or longer than III, rather than 0.14 to 0.3 mm. shorter.

Types.—Type in the U. S. National Museum. Paratypes in the collections of the Utah and Colorado Agricultural Experiment Stations, and in the collection of the writer.

Legend

Amphorophora goldamaryae n. sp. Alate, A-B; aptera, C-F. **A. janesi** n. sp. Alate, G-I; aptera, J-N. **Macrosiphum thermopsaphis** n. sp. Alate, O. S; aptera, P-R, T.



RECORDS OF HISTERIDAE FROM IOWA

MELVILLE H. HATCH, University of Washington

Wickham (Bull. Lab. Nat. Hist., State Univ. Iowa, VI, 1909, pp. 19-20) lists 40 species of Histeridae from Iowa, which, according to the classification given in Leng's **Catalogue,** may be reduced to 38 species and two varieties. The present paper adds 14 species and four varieties to this list.* In addition notes are given on another species, a new species of **Dendrophilus** is described, and a key to the North American and European species of the genus is given. This contribution has been made possible through the kindness of Prof. H. E. Jaques of Iowa Wesleyan College in allowing me to study some of the Iowa Histeridae in his collection.

List of Species

Hister interruptus Beauv. Des Moines Co., Jackson Co., Louisa Co., Page Co.

Hister jaquesi Hatch. In addition to the type from Mt. Pleasant, I have now seen two additional specimens from the type locality and one specimen from Jackson Co.

Hister marginicollis LeC. Adair Co., Kossuth Co., Linn Co., Louisa Co., Page Co., Scott Co. (Davenport), Taylor Co., Union Co.

Hister (Atholus) americanus var. **perplexus** LeC. This form, recorded from the state by Wickham, is represented in the present collection by specimens from a series of counties (Adair Co., Appanoose Co., Des Moines Co., Dickinson Co., Henry Co. (Mt. Pleasant), Ida Co., Marion Co., Union Co.). The fifth dorsal stria may be arcuate at the base and joining the sutural, or the sutural stria may be abbreviated at the base with the fifth dorsal entire (the usual condition in this series), or both fifth dorsal and sutural may be abbreviated at the base.

Hister (Atholus) nubilus LeC. Clarke Co.

Platysoma aurelianum Horn. Dickinson Co., Lucas Co., Scott Co., (Davenport).

Platysoma (Cylistosoma) coarctatum LeC. Washington Co.

* In addition Casey (Mem. Col., VI, 1916, pp. 211, 253) has described **Hister (Spilodiscus) iowensis** and **Acritus (Aeletes) politus** subsp. **robustulus** from the state, making a total of 53 species and seven varieties of Histeridae now recorded from Iowa.

Phelister vernus Say. Des Moines Co.

Xestipyge geminatum LeC. Scott Co.

Dendrophilus sexstriatus sp. nov. Henry Co. (Mt. Pleasant), Monroe Co.

Saprinus posthumus Mars. Bremer Co., Mardin Co., Henry Co. (Mt. Pleasant), Jackson Co., Jefferson Co.

Saprinus lugens Er. Cerro Gordo Co., Dickinson Co., Jefferson Co., Monroe Co., Polk Co., Scott Co. (Davenport).—ab. **oregonensoides** Hatch. Cerro Gordo Co., Dickinson Co.— ab. **distinguendoides** Hatch. Monroe Co., Scott Co. (Davenport).— ab. **sejunctoides** Hatch, Can. Ent., LXI, 1929, p. 78 (Dickinson Co.).

Saprinus lecontei Csy. Des Moines Co., Dickinson Co., Henry Co. (Mt. Pleasant), Jefferson Co., Louisa Co., Mahaska Co., Page Co., Van Buren Co.

Saprinus oregonensis LeC. ab. **distinguendus** Mars. Dickinson Co.

Saprinus assimilis Payk. ab. **semisulcatus** Hatch. Des Moines Co., Dickinson Co., Henry Co. (Mt. Pleasant), Jefferson Co., Mahaska Co., Van Buren Co., Wright Co. This abberation was established for those specimens in which the marginal groove of the pygidium is interrupted at the apex. About half the series of about fifty Iowa specimens of this species at hand exhibit this character, which varies all the way from a very narrow to a very wide interruption of the groove.

Saprinus (Hypocaccus) jaquesi Hatch., Can. Ent., LXI, 1929, p. 83 (Dickinson Co.).

Dendrophilus sexstriatus sp. nov.

Length 3 mm.; black; head and pronotum densely punctate, alutaceous; the punctures of the pronotum just visibly less dense at the center of the disc and in general less dense than on head; pronotum with apex and margins margined; elytra alutaceous throughout, somewhat more strongly so towards apex, densely punctate at apical half and on the sides to the first dorsal stria, the extreme apex somewhat strigose, the intervals between the first and second and the second and third dorsal striae more finely and sparsely punctate, the scutellar area mesad of the third dorsal stria very finely and sparsely punctate, shining; elytra with outer subhumeral entire, deep-

ly impressed, with the inner subhumeral obsolete, with five dorsals and a sutural present and punctate but becoming lost in the apical punctate area at about the apical two-fifths, the sutural and fifth dorsal somewhat more feebly impressed than the others; epipleurae densely punctate, broadly margined along inner side; propygidium, pygidium, legs, and venter nearly as in **punctatus.**

Type and paratype: Monroe Co., Iowa. Apr. 21, 1930. H. Knight (in collection of author). Paratype: Mt. Pleasant, Ia., Feb. 26, 1931. Hagedun (in collection H. E. Jaques).

This species may be distinguished from the other North American and European species of the genus by means of the following key. Of the species cited in the key, **californicus** is known to me from description only.

Key to North American and European Species of **Dendrophilus** Leach

A. Dorsal surface and elytral striae punctate; color black

B. Elytral surface nearly equally shining throughout

C. Elytra nearly uniformly punctate, only dorsal striae one to four present, the fifth dorsal and the sutural nearly completely obsolete; length 3 mm.; Europe, Caucasus; Quebec (**Chagnon**) and District of Columbia (**Ulke**) to Manitoba (**Leng**) and Kansas (**Hatch**); (**punctulatus** Say) ..... **punctatus** Herbst

CC. Elytra coarsely and densely punctate apically and laterally, finely sparsely punctate over an extensive sutural area; dorsal striae one to five and a sutural stria present, the fifth dorsal and the sutural somewhat more feebly impressed than the others; length 3 mm.; Iowa. ..... **sexstriatus** sp. nov.

BB. Elytra dull at apex; dorsal striae one to four impressed, the fifth dorsal and the sutural stria short and composed of punctures only; length 3 mm.; California. ..... **californicus** Horn

AA. Dorsal surface opaque, impunctate; elytra with four or five finely impressed impunctate dorsal striae; gen-

eral color dull rufous; length 2.5-3 mm.; Europe ..... **pygmaeus** L.

The separation of **punctulatus** Say and **punctatus** Herbst has rested largely upon the results of the examination of a single American specimen by Marseul in 1857 (Ann. Soc. Ent. Fr., (3) V, 1857, p. 436) in which that author reports that **punctulatus** "is very similar to **D. punctatus,** but its size is a little greater (3.5 as opposed to 3 mm. in length); its elytra proportionately more elongate; its punctation more dense, more fine; its front less convex; the suture of its elytra elevated and its striae differing in number (4 in **punctulatus,** 5 in **punctatus**) and in relative length."* The figures of the two species given by Marseul (l. c. (3) III, 1855, pl. IX, fig. XXX, 1 and (3) V, 1857, pl. XI, fig. XXX, 1) are indistinguishable, except that a short subhumeral stria is figured for **punctulatus.** In my opinion all the differences cited are within the limits of individual variation. Especially are there variable but very feeble evidences of a subhumeral and fifth dorsal and even a sutural stria in both American and European specimens.

* Translation by author.

THE DIPTEROUS FAMILIES NEMESTRINIDAE, CYRTIDAE, AND SCENOPINIDAE IN COLORADO

MAURICE T. JAMES, Colorado State College.

Only one species of Nemestrinidae, two of Cyrtidae, and one of Scenopinidae have been recorded in literature from Colorado, so far as I can determine. The following remarks will add to our knowledge of these rather uncommon families.

NEMESTRINIDAE

Neorhynchocephalus sackeni Williston

This species is not as uncommon in Colorado as has formerly been supposed. It occurs regularly in mixed grassland **(Stipa comata, Agropyron smithii)** near Boulder in June and July; I also have Colorado records as follows: Masonville, May 30, 1936 (M. T. James); Spring Canyon, Ft. Collins, June 8, 1936 (James); Horsetooth Gulch, near Ft. Collins, June 15, 1895 (Gillette and Baker); Ft. Collins, June 12, 1900; Crystal Springs Country Club, Flagler, July 25, 1933 (H. G. Rodeck, M. T. James).

CYRTIDAE

Acrocera obsoleta Van der Wulp.

Cole recorded this species from Denver.

Acrocera convexa Cole.

4 males, 4 females, Ft. Collins, Aug. 12, 1937 (M. T. James); 2 males, 1 female, Ft. Collins, Aug. 13, 1937 (Helen B. James)

These specimens were taken in a sedge border of a cat-tail marsh about 5 miles southwest of Ft. Collins. The milkweed, **Asclepias incarnata** L., formed a conspicuous part of the flora of the region.

Ogcodes albicinctus Cole.

Cole has recorded this species from Ft. Collins; I have a series from Boulder, June 9, 1928 (E. C. Nelson), and Boulder, Feb. 28, 1933 (C. H. Hicks). The latter

specimens had been used by a wasp, species unknown, to stock its nest.

Opsebius diligens Osten Sacken

Female, Boulder, June 25, 1931 (T. D. A. Cockerell).

SCENOPINIDAE

Pseudatrichia helenae, new species.

Related to **P. griseola** Coq., but smaller in size, the abdomen is definitely marked with black, the femora are black, and the knobs of the halteres are white. The abdomen is varied black and yellow, not black and white, as in **albocincta** Cole, and the arrangement of the pilose areas of the thorax is much different.

Male. Length, 2-2.5 mm. Frontal triangle, facial orbits, cheeks, and the narrow occipital orbits yellow; the frontal triangle somewhat clouded with pollen; proboscis dull yellow; antennae black. Thorax black in ground color, but yellow on the humeri, a spot behind each humerus and contiguous with it, the post alar calli, the sides of the scutellum, a large part of the propleura, and an extensive, somewhat interrupted, area below each wing and taking in parts of the pteropleura, sternopleura, hypopleura, and metapleura; the black parts are clouded by a grayish pollen which becomes yellowish-gray on the dorsum, where there is evidence of three indistinct brown stripes. Abdomen yellow; the first segment, however, except at the narrow base and apex, black; the second, third, fourth, and fifth segments each with a transverse black marking basally; the pile of the thorax and abdomen as well yellow, rather sparse. Genitalia rather large, brown at base, yellow at apex. Femora black, tibiae yellow, tarsi brown. Halteres brown, the knobs yellow.

Holotype, male, and paratype, male, Roggen, Colo., May 29, 1937 (Helen B. James).

Scenopinus ramaleyi, new species.

Related to **nubilipes** Say, but smaller; the thorax is entirely black; the veins of the wing are brown and much heavier than in **nubilipes,** and the first posterior cell is of

an entirely different shape, being almost as broad at its apex as at its broadest point.

Male, length, 2 mm. Head, including antennae and proboscis, black; the frontal triangle narrow, polished; the facial orbits and cheeks narrow, polished, with fine longitudinal striae. Thorax and scutellum entirely black; the dorsum opaque except along its posterior margin and clothed with scattered, appressed, flattened hairs; the posterior part of the dorsum and the scutellum shining. Abdomen black; the short third, fourth, and fifth segments, however, white, dorsally, except for small black lateral triangles; genitalia black. Legs black, the tarsi brownish-yellow. Wings hyaline, the veins brown, quite distinctly contrasting with the membrane in color; Vein R5 about three-fifths the length of that section of R4+5 from cross-vein r-m to the furcation; R5 somewhat bowed toward M1; if straightened, these two veins would be almost parallel; the first posterior cell is about as broad at its apex as at the broadest part. Halteres brown, the knob mostly white.

Female. As in the male, except that the eyes are broadly separated, the front is roughened, the abdomen is wholly shining black, and the knobs of the halteres have a considerable amount of brown on them. Length, 2.5 mm.

Holotype, male, allotype, female, Roggen, Colorado, May 29, 1937 (Helen B. James).

I take pleasure in dedicating this species to Dr. Francis Ramaley, who, several years ago, introduced me to this interesting locality.

Scenopinus fenestralis L.

Ft. Collins, Colo., July 16, 1936 (M. T. James); Boulder County, Aug. 18, 1926 (C. H. Hicks).

A FIELD KEY TO KENTUCKY WHITE GRUBS *

P. O. RITCHER, Kentucky Agricultural Experiment Station, Lexington

Study of the white grubs (Phyllophaga) has been handicapped by the lack of field keys for identifying the various species. This has necessitated the rearing of large numbers of grubs to the adult stage, often with heavy mortality and much loss of time.

Rearing of white grubs and the study of adult May beetle distribution has been carried on by the writer in Kentucky for the past two years. In designing a field key, use has been made, firstly, of grubs reared from eggs laid by identified females and, secondly, of third stage moult skins of species reared and identified as adults.

Twenty-six species of May beetles are now known to occur in Kentucky. The most common species are **Phyllophaga hirticula** (Knoch), **inversa** (Horn), **futilis** (LeConte), **tristis** (Fab.), **hornii** (Smith), **bipartita** (Horn), **fusca** (Froehl.), **implicita** (Horn), **praetermissa** (Horn), **crenulata** (Froehl.), and **ephilida** (Say.). The fourteen species listed in the key include all the common species except **P. hornii** and four of the less common species. With the exception of **P. praetermissa, arkansana,** and **fervida** numerous specimens of the grubs of each species have been examined.

In the key only structures are used that can be made out with a binocular microscope on living or dead grubs. No dissection is necessary. The epipharynx may be examined without harm to live grubs by using a dissecting needle to turn back the labrum.

The simplest of terms have been used and where possible the best known terms have been employed. In most cases Hayes (1928) has been followed. The terms submarginal and marginal ridges are used instead of submarginal and marginal striae since striae refer to furrows between ridges and not the ridges themselves.

All the species of grubs with more or less blade-like radular spines have the majority of the bases of the

* The investigation reported in this paper is in connection with a project of the Kentucky Agricultural Experiment Station and is published by permission of the Director.

spines in each row separated by a distance as great as or greater than the width of a spine at its base. Most of the species with depressed or conical radular spines have the bases of most of their radular spines separated by a distance less than the width of a spine at its base.

It is realized that the key as presented is not perfect. Because of the variation found even in the characters of a given species, occasional grubs may not key to the correct species. Too, since the species ranges are made as broad as possible, grubs of species not included will, of course, key incorrectly.

FIELD KEY TO KENTUCKY WHITE GRUBS

1. Radular spines (Fig. 4) more or less blade-like (compressed); tips of spines turning in, often hook-like (Figs. 2a, 2b) 2

   Radular spines depressed or conical; tips never turn in but may bend out (Figs. 3a, 3b) 8

2. Thirteen or fewer radular spines in each row 3

   Fourteen or more radular spines in each row 4

3. Less than 9 radular spines in each row; submarginal ridges, two or three on each side....**P. praetermissa**

   Nine to 13 radular spines in each row; submarginal ridges very indistinct; 5 or 6 in number on each side .....**P. implicita**

4. Five or fewer indistinct submarginal ridges on each side; ridges often appear to be absent 5

   Five to more than ten well developed submarginal ridges on each side (Fig. 1) 6

5. Less than 18 radular spines in each row..**P. arkansana**

   More than 20 radular spines in each row....**P. inversa**

6. Radular spines distinctly blade-like (Figs. 2a, 2b), tips more or less hook-like 7

   Radular spines not distinctly blade-like, but tips turn in .....**P. ephilida**

7. Nine or more submarginal ridges on each side ..... **P. fusca**

   Five to 8 submarginal ridges on each side..**P. fervida**

8. Fewer than 10 submarginal ridges on each side 9
   Ten or more submarginal ridges on each side 13

9. Submarginal ridges absent. Sparse, radular rows of from 10 to 13 spines curved to form a wide oval ..... **P. tristis**

   Submarginal ridges present 10

10. Three to 4 small, short, submarginal ridges..**P. micans**
    Six to 9 submarginal ridges 11

11. Six, or rarely 7, well developed submarginal ridges ..... **P. bipartita**

    Seven to nine submarginal ridges 12

12. Radular spines very long and sharp, at least 4 times as long as the width of their bases ..... **P. futilis**

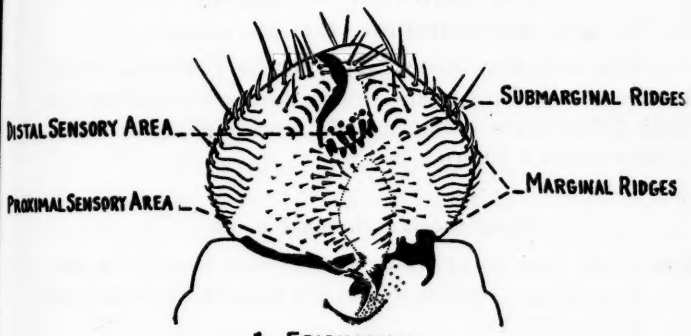
    Radular spines shorter and usually blunter..... .... **P. hirticula**

13. Twenty-two or fewer radular spines in each row .. .. **P. crenulata**

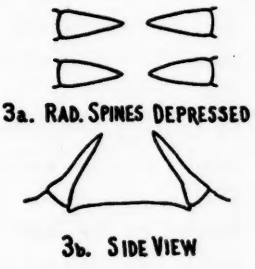
    More than 23 radular spines in each row....**P. prunina**

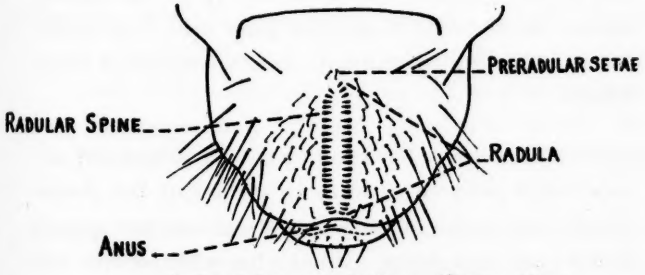
Literature Cited

Hayes, Wm. P. 1928. The epipharynx of lamellicorn larvae (Coleop.) with a key to common genera. Annals Ent. Soc. Amer., 21, No. 2 pp. 282-306.



1. EPIPHARYNX





4. LAST SEGMENT OF GRUB, VENTRAL VIEW

A NEW GRAPTOCORIXA FROM MEXICO (CORIXIDAE-HEMIPTERA)

H. B. HUNGERFOORD, Lawrence, Kansas *

In a collection of several hundred Corixidae made by Mr. Henry Thomas in Mexico during the summer of 1936, I find three specimens of an unusually interesting species which I describe below:

Graptocorixa thomasi n. sp.

Size: 9.9 mm. long; width across head from 3.15 mm. to 3.24 mm., which makes it a moderately large and broad species.

Color: General facies moderately dark. In one specimen only the venter of the prothorax is dark, in another the venter of the thorax and the basal abdominal segments are nearly black. Pronotum crossed by thirteen or fourteen dark bands that are, on the whole, slightly narrower than the pale interspaces. Corium and clavus crossed by transverse wavy bands; on the inner angles of the clavus, the pale bands are broader than the dark ones—elsewhere the reverse is true, except at the tip of the corium where there is an ill-defined pale area; the membrane is crossed by undulate bands; embolium sooty black.

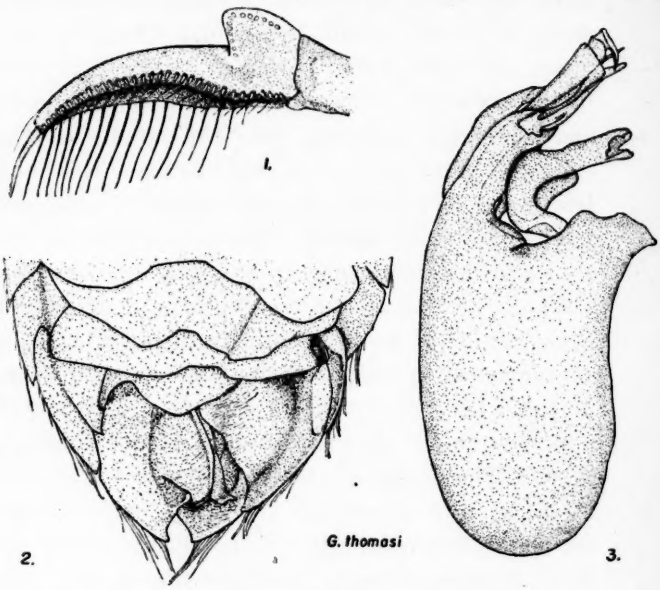
Structural Characters: Face somewhat narrowed but not as greatly reduced as in some species of the genus. Facial depression of male very slight and but sparsely covered with hairs. Hemelytra with corium and clavus rastrate. Metaxyphus long and slender.

* Contribution from Department of Entomology, University of Kansas.

Anterior femora of females of nearly uniform diameter, near the middle the caudal margin is produced and bears a row of four or five long bristles. In the male the anterior femora are conspicuously and angularly produced near the middle of the caudal margin, and on the inner surface at this point is a transverse ridge from the distal side of which are five stout curved bristles. The pala of the male is shown in the figure, its peculiar shape making this a readily recognized species; the pala of the female is typical of the genus; the tarsus of the middle leg conspicuously longer than the tibia; the tibia of posterior leg with anterior margin distally produced and spine tipped; the first tarsal segment relatively broad. The dorsal side of the abdomen of the male as shown in the drawing. The strigil consists of two rows and the caudal lobes of the abdomen have the inner margins curiously modified into broad, more or less hook-like structures. The male genital capsule and its parts unusually complicated as shown in the figure.

Location of Types: Holotype, allotype and one paratype (male) in Francis Huntington Snow Collection, University of Kansas. They are labeled "El Sabino, Uruapan, Mich., Mexico, Aug. 2, 1936. H. D. Thomas."

Comparative Notes: Among other of the larger species of the Genus Graptocorixa this one may be recognized by its comparative short body. The unique shape of the male pala and the elongate middle tarsus readily characterize the species.



Text figure 1.—Graptocorixa thomasi Hungerford

1. Pala of male. 2. Abdominal dorsum of male. 3. Male genital capsule.

TWO NEW SPECIES OF LONATURA (HOMOPTERA-CICADELLIDAE)

R. H. BEAMER, Lawrence, Kansas*

Lonatura megalopa Osborn and Ball

Lonatura megalopa O. & B. Proc. Dav. Acad. Sci., vii, p. 85, pl. 4, fig. 1, 1898.

Three pairs of cotypes from the collection of Iowa State College have been examined together with 15 specimens from Russell, Manitoba, collected August 1, 1937, now in the Snow Entomological Collections. As far as I am aware, this is the first time this species has been taken since the original series.

Internal male genitalia: Style very heavy at middle, tapered toward either end, apical sixth strongly narrowed and bent out. Pygofer narrowed into a sharp tooth at outer ventral corner. Aedeagus in dorso-ventral view bulbous at base, narrowing to a slightly bifid apex, with a short, sharp, lateral tooth either side near tip; in lateral view, very broad on basal half, with large angular hump on ventral margin, abruptly narrowed to rather slender shaft, bent dorsally almost at right angles on outer fourth.

The male described above is here designated Lectoholotype and the female figured Lectoallotype. In the collection at Iowa State College, Ames, Iowa.

This species was referred doubtfully to Lonatura by the authors. It has since been placed in the genus Deltocephalus. After careful study of the above specimens and those of the following species, I am of the opinion that they are more closely related to certain species of Lonatura than to those of Deltocephalus. It is possible they belong to an undescribed genus, but for the present it seems best to leave them in Lonatura.

Lonatura punctifrons n. sp.

Resembling **Lonatura megalopa** O. & B., but slightly smaller, markings of vertex not so extensive, color of front mostly confined to a large black spot, last ventral

* Contribution from Department of Entomology, University of Kansas. Illustrations by Miss Maxine Graham.

segment of female decidedly more excavated on lateral margins, median projection of posterior margin not notched and aedeagus of male with a long, very slender, forward projecting spine just beyond middle on ventral side. Length ♀ 2.75, ♂ 2.25 mm.

Vertex conical, margins rounded. Elytra short, exposing at least six abdominal segments, apices truncate, costal margin longest, apical cells absent in short winged forms; hind wings reduced to rounded pads.

General ground color yellowish brown. Vertex with two small triangular black spots at apex, two much larger, irregular-sided black spots posterior to these and an indefinite short, dark dash near each eye at base. Pronotum and elytra almost hyaline, veins lighter, rarely slightly margined with fuscous; abdominal segments cross-banded as follows: basal black, median brown and outer cinereous. Front with median dark spot and an almost solid dark band connecting eyes.

Genitalia: Last ventral segment of female three times as long as preceding, lateral margins strongly excavated from base, exposing underlying membrane, posterior margin almost straight to short median strap-like process. Valve of male slightly longer than preceding segment, angular; plates wider than valve at base, sinuately narrowed on outer margin to sharp apices; aedeagus in dorso-ventral view enlarged at base, narrowed to long slender tip, in lateral view with very long base, slightly curved dorsally, narrowed to slender, slightly enlarged apex with a slender, very sharp forward projecting spine on ventral margin one third distance from tip.

Holotype male, allotype female, and four pairs of paratypes, Lake City, Colo., June 29, 1937, R. H. Beamer; 4 long-winged ♀s and 2 short-winged ♂ paratypes, Pingree Park, Colo., Aug. 10, D. A. Wilbur. Types and paratypes in Snow Entomological Collection; paratypes in Kansas State College Collection.

Lonatura delicata n. sp.

Resembling **Lonatura punctifrons,** but distinctly smaller, without the black spot on front and with the last ventral segment of female with lateral margins more roundingly excavated and the posterior margin rounded

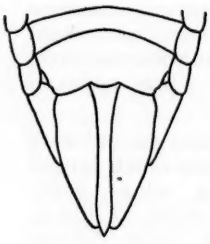
without the definite median strap-like process. Length ♀ 2.5 mm.

Vertex slightly longer than wide, conical, margins curved. Elytra short, exposing 6-7 segments of abdomen, apices truncate, costal margin longer, venation distinct; much reduced, apical cells absent, hind wings reduced to small pads.

General ground color yellowish brown; vertex with two small black triangles at apex and two much longer black spots back of these; pronotum and wings semi-hyaline; dorsum of abdomen with last segment black, penultimate two thirds black and others with lateral black spot occupying about basal two thirds; face evenly buff-colored, slightly suffused with darker brown; venter of abdomen more or less black.

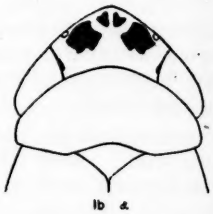
Genitalia: Last ventral segment of ♀ about 3 times as long as preceding, lateral margins deeply excavated almost to base, lateral angles broadly rounded to almost truncate posterior margin with only a slightly bilobed indication of median strap-like process; underlying membrane broadly exposed at outer corners.

Holotype ♀ and 1 ♀ paratype, Silver City, New Mexico, July 22, 1936, R. H. Beamer. In Snow Entomological Collection.



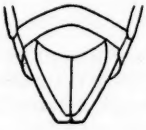
1a

1. Lonatura punctifrons ♀



1b ♂

2. Lonatura delicata ♀



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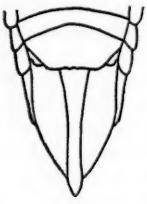
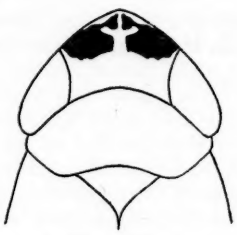
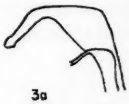
1d



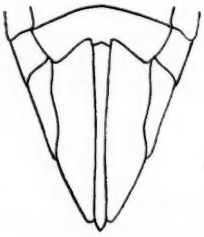
2a



3. Lonatura megalopa ♂

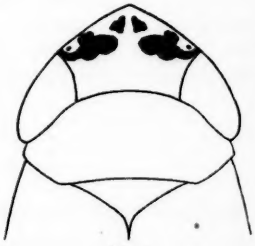


3a



3b

3c



3d ♀

KANSAS ACADEMY OF SCIENCE 1938 MEETING

The 70th annual meeting of the Kansas Academy of Science will be held at the Kansas State Teacher's College, Pittsburg, Kansas, on March 31, April 1 and 2, 1938. The Secretary, Dr. Roger C. Smith, has just announced the meeting dates as decided by the committee on arrangements, of which Professor William Matthews of Pittsburg is chairman, and of the executive council. The Kansas section of the American Association of University Professors and two sections of the Kansas Mathematical Society are expected to meet with the Academy at that time. The Kansas Entomological Society voted recently to meet at Pittsburg with the Academy. The committee of arrangements is making more than usual efforts to secure leading speakers for the two evening lectures. Field trips to lead and zinc mines and coal strip mines of the region will be provided.

The 1936 volume of the Transactions of the Academy which is volume 39 was distributed to the members and co-operating libraries in August. There is a possibility that volume 40 will be printed and distributed before the close of 1937. Thirty-seven applications for membership in the Academy since April 7th were lately placed before the membership committee.

THE DEAN-NABOURS CELEBRATION.

Prof. Geo. A. Dean, head of the Department of Entomology, and Dr. R. K. Nabours, head of the Department of Zoology, of the Kansas State College of Agriculture and Applied Science, Manhattan, Kansas, were honored on October 1 and 2 at a joint celebration upon the completion of 25 years as heads of their respective departments. Dr. H. B. Hungerford, head of the Department of Entomology, University of Kansas, Lawrence, Kansas, gave the opening address at a special meeting of the Zoology-Entomology Seminar on Friday, October 1, on the subject "Interesting Aspects of World Distribution of Aquatic Hemiptera". Dr. Paul S. Welch, member of the entomological staff of Kansas State College from 1913 to 1918, now Professor of Zoology, University of Michigan, Ann Arbor, Mich., gave an illustrated address in the evening on the subject "The Oxygen

Balance in Inland Waters and the Hazards of Aquatic Respiration". The two departments held "open house" on Saturday afternoon, October 1, displaying the major accomplishments of 25 years and research work now in progress. A special bulletin (Kansas State College Bulletin, Vol. 21, No. 9, 55 pp., 1937) giving biographies of Professors Nabours and Dean, a survey of the accomplishments, and titles of all published papers from the two departments in the 25 years, was first distributed at the banquet. A bound volume of letters from students and friends also was presented to each of them at the banquet.

NOTICE

The Fourteenth Annual Meeting of the Kansas Entomological Society will be held April 2, 1938 at the Kansas State Teachers College, Pittsburg, Kansas.

~~Members wishing to present papers should submit titles to the Secretary not later than March 15, 1938.~~

H. H. Walkden, Secretary-Treasurer
1204 Fremont St.,
Manhattan, Kansas.

Correction—Members wishing to present papers should submit titles to the Secretary not later than March, 1, 1938.

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